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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Advisory Action Before the Filing of an Appeal Brief	Application No. 10/574,664	Applicant(s) KIKUCHI, TSUNEYUKI	
	Examiner MELODY MEHRPOUR	Art Unit 2617	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 08 May 2009 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:
   a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   (a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
   (b) ☐ They raise the issue of new matter (see NOTE below);
   (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☒ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.
   The status of the claim(s) is (or will be) as follows:
   Claim(s) allowed: _____.
   Claim(s) objected to: _____.
   Claim(s) rejected: *1-4,6-12,14-20 and 22-26*.
   Claim(s) withdrawn from consideration: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: see the attachment.
12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
13. ☐ Other: _____.

/Naghmeh Mehrpour/
Primary Examiner, Art Unit 2617

Response to Arguments
3. Applicant's arguments filed 5/9/09 have been fully considered but they are not persuasive.

In response to the applicant's argument that Haartsen's system assigning base station radio to the remote terminal based on the required bandwidth ratio, NOT Bandwidth."
THE Examiner asserts that to connect a mobile or cordless terminal to the backbone network, both an access point to the network (e.g., a radio base station) must be available and a radio channel must be available to connect the terminal to the access point. Both the access point and the radio channel can be considered allocable system resources. When a connection has to be made, the access point and/or the terminal has to select a radio channel, but radio resources are scarce. The cellular system concept is a way to support a large number of terminals with a limited radio spectrum by organizing the spectrum into channels that can be used simultaneously for different connections, provided the geographical distance between users participating in different connections is large enough that their mutual interference is small relative to their intended received signals. In most cellular systems, the access point closest to a remote terminal seeking a connection is allocated to that terminal since that access point usually provides the lowest propagation loss to that terminal. The remote terminals regularly scan the spectrum for control or beacon signals broadcast by the access points on predetermined radio channels, and each terminal locks, or synchronizes, itself to the strongest control or beacon channel it receives. In some mobile systems, a terminal does not by default lock to the strongest access point but chooses an access point based on other criteria, e.g., whether a base station has radio channels available and/or whether the interference on any available radio channels is sufficiently low. Indeed, it is not the channel having the highest carrier power that is important but the channel having the highest carrier-to-interference (C/I) ratio. An exemplary communication system in which base station and channel selection are based on the C/I ration is described in the U.S. Pat. No. 5,491,837 to Haartsen for "Method and System for Channel Allocation Using Power Control and Mobile-Assisted and overeasurements", which is expressly incorporated here by reference. In general, a "channel" can be a carrier frequency, a time slot, a code, or a hybrid of these, according to the particular access technique used by the communication system. In a frequency division multiple access (FDMA) system, a radio channel is a radio frequency (RF) carrier signal for transmitting and an RF carrier signal for receiving that are usually allocated for the duration of a communication session. (Separating the transmit and receive carriers, which are usually selected from respective dedicated bands, permits simultaneous transmission and reception and is called Frequency Division Duplex (FDD).) The Advanced Mobile Phone System (AMPS) and the Nordic Mobile Telephone (NMT) system are examples of simple FDMA systems that use carrier frequency modulation. In a time division multiple access (TDMA) system like GSM, each carrier signal is time-shared by up to eight users, i.e., each carrier signal transports successive frames of eight time slots each, and one or more time slots in each frame are allocated to the session. In a direct-sequence code division multiple access (CDMA) system, an information bit stream to be transmitted is effectively superimposed on a much-higher-rate bit stream that may consist of successive repetitions of a unique code sequence, and the superimposed bit streams may then be scrambled by multiplication by another, usually pseudo-noise, bit stream, with the result transmitted as a modulation of an RF carrier signal. First-generation cellular systems like AMPS and the NMT system are analog, which is to say that an analog (temporally continuous) information signal to be transmitted modulates the frequency of the carrier signal. The primary use of analog systems is voice service, although low-rate digital data transmission is possible by using analog modems. In second-generation systems like GSM and D-AMPS, the information signal to be transmitted is digital (binary bits), which enables the information to be compressed, error-correction coded, organized into packets, and transmitted in bursts or packets. Thus, a carrier signal does not have to be in use all the time for one connection; instead, the carrier can be divided into slots, and different slots can be allocated to different users as in TDMA. In current second-generation TDMA systems, as well as in CDMA systems, the spectrum is still divided into bands of carrier frequencies, so such systems still have FDMA elements. If each carrier is divided into time slots, this results in a hybrid FDMA/TDMA system, and if each user is separated by a respective code, this results in a hybrid FDMA/CDMA system. Hybrid FDMA/TDMA/CDMA systems have also been described. In addition the Examiner asserts that Haartsen provides, in a communication system that implements communication links between a multi-radio base station and a plurality of remote terminals, wherein each remote terminal requests a particular bandwidth ratio, a method of allocating slots in the communication links comprising the steps of: (a) sequentially assigning, in descending order based upon the respective remote terminal's required bandwidth ratio, remote terminals to an available base station radio, and (b) after the available base station radios have been assigned a first remote terminal, assigning the remaining remote terminals, in descending order based upon the respective remote terminal's required bandwidth ratio, to the base station radios in the reverse sequence implemented in step (a). In another aspect, the invention provides, in a communication system that implements communication links between a multi-radio base station and a plurality of remote terminals, wherein each remote terminal requests a particular bandwidth ratio, a method of allocating slots in the communication links comprising the steps of: (a) determining the minimum number of base station radios required to support the remote terminals' transmission requirements, and (b) sequentially assigning, in descending order based upon the respective remote terminal's required bandwidth ratio, remote terminals to an available base station radio selected from the minimum number of base station radios calculated in step (a), and (c) after the available base station radios have been assigned a first remote terminal, assigning the remaining remote terminals, in descending order based upon the respective remote terminal's required bandwidth ratio, to the base station radios in the reverse sequence implemented in step (b).

Haartsen further teaches radio systems using digital modulation commonly have carrier signals divided into successive time slots. FIG. 2 depicts the slot structure of a TDD system having a base station BS and a mobile station MS that alternately transmit and receive. A packet or burst containing a sequence of information bits can be sent in each time slot. The successive time slots can be identified by a running index k, and carrier frequencies used in the slots can be identified by for example F_k, G_k, etc., where F and G indicate different hop sequences. Some communication systems employ packets that carry 30-300 bytes of information. In principle in a TDD system, a decision can be made for each slot whether to use that slot for transmission or for reception. In addition, the carrier frequency used for each slot can be any valid frequency present in the spectrum occupied by the communication system. For many conventional TDD systems, the carrier frequency F_k used in one slot is the same as the carrier frequency F_k+1 used in the next slot, which is to say that all transmissions and receptions between a BS and an MS use the same carrier frequency. For more advanced systems, the carrier frequency F_k used in a slot is not the same as the carrier frequency F_k+1 used in the next slot, which is to say that a different carrier frequency can be selected for each slot. In these more advanced systems, the radios at the sender and the receiver hop in synchrony according to an agreed hopping sequence, which is usually pseudo-random. When the radios alternately transmit and receive as illustrated in FIG. 2, the bandwidth in the uplink is identical to the bandwidth in the downlink, provided the same type of packets (e.g., same error

correction coding, etc.) are used in both links. This results in symmetric or balanced links. In accordance with Applicant's invention, it is possible to change the balance and increase the bandwidth in one direction at the expense of the bandwidth in the other direction in a TDD system. This is illustrated by FIG. 3, which depicts a slot structure having a downlink (from BS to MS) bandwidth that is three times as much as the bandwidth of the uplink, i.e., there is a 3:1 ratio between the link bandwidths. In essence, three times as many slots are devoted to the downlink (e.g., the slots using carrier frequencies F_k, F_k+1, F_k+2) as are devoted to the uplink (e.g., the slot using carrier frequency F_k+3). The downlink and uplink bandwidths are preferably determined, of course, by the respective service requirements of the downlink and uplink. For a voice service, symmetric, or balanced, links having bandwidth ratios of 1:1 are usually desired since both speakers should have the same bandwidth since each can be expected to speak half the time. Data applications, however, naturally tend to unbalanced links; a service for a client-server application, for example, usually requires more bandwidth in the server-to-client direction since the information flow in the other direction is usually merely low-rate control information. A TDD communication system can quickly implement an unbalanced service, and the bandwidth allocation can be carried out dynamically since the same service may require different bandwidth allocations at different moments. For example, a downlink and uplink may have the 3:1 bandwidth ratio as illustrated in FIG. 3 at one moment, but at another moment they may have a 1:2 ratio, which is illustrated in FIG. 4. Dynamic bandwidth allocation is a great strength of a TDD system in accordance with Applicant's invention. It will be appreciated that the TDD system can also support symmetric services by (dynamically) allocating bandwidth such that the same number of slots is assigned to a downlink and to an uplink (a bandwidth ratio of 1:1, as seen, for example, in FIG. 2). Such varied bandwidth allocations can be realized simultaneously for a plurality of different connections by a multi-radio station 500 that is illustrated in FIG. 5. It will be understood that Applicant's multi-radio configuration is not restricted to base stations but can be used in remote terminals as well. In FIG. 5, the multi-radio station 500 comprises a plurality N of separate radios 502-1, 502-2, . . . 502-N that are shown co-located in the same device. Each of the N separate radios may be configured like the radio 100 depicted in FIG. 1, but in practice, it is expected that many components may be shared among some or all of the N radios 502. As just one example, a single antenna can be used for all N radios in a multi-radio station, although FIG. 5 depicts separate antennas 504-1, 504-2, . . . 504-N for each of the N radios 502. As another example, a power amplifier for boosting the level of signals for transmission can be shared among several or all of the N radios. Using TDMA, a single-radio base station can support several users by allocating different time slots to different users. Demonstrative slot structures for this kind of operation for a communication system comprising a base station BS and two remote terminal MS_A, MS_B are depicted in FIGS. 6A, 6B. The system has allocated different slots to the mobile stations MS_A, MS_B as indicated by the different lengths of the vertical arrows, and the downlink/uplink bandwidth ratios are 3:1 for MS_A and 2:1 for MS_B in both figures. It will be appreciated that it is generally not necessary for the slot(s) of any particular uplink to appear immediately after (or before) the slot(s) of the corresponding downlink. FIG. 6A shows the case in which the BS and MS_A exchange a bidirectional set of slots and then the BS and MS_B exchange a bidirectional set of slots and so forth, i.e., the link ratios alternate between 3:1 and 2:1. In FIG. 6B, both downlinks occur in succession and then both uplinks occur in succession and so forth, for what might be considered a kind of combined bandwidth ratio of 5:2, evaluating the bandwidth ratio as the number of consecutive downlink slots divided by the immediately succeeding number of consecutive uplink slots. It will be recognized that FIG. 6A and FIG. 6B show the same throughput performance for both MS_A and MS_B. It can be seen from FIG. 7B that MS_C's 4:1 bandwidth ratio service can now be provided by RAD2 without interfering with RAD1, provided that two extra unused slots are added to RAD2's slots structure. As described above in connection with FIG. 6B, the slot structure of RAD1 has an overall 5:2 bandwidth ratio and the extra slots for RAD2 fill out or pad RAD2's slot structure from the 4:1 bandwidth ratio required by MS_C to the 5:2 ratio. Thus, transmission and reception of the different radios in a multi-radio base station are scheduled such that the overall bandwidth ratios of the different radios are the same and that transmission and reception by the different radios occurs in the same slots.

In the example illustrated in FIG. 7B, only 5/7 of the maximal throughput is used to provide the 4:1 bandwidth ratio service requested by MS_C. (The maximal link throughput is obtained when all slots are occupied.) Since the throughput to a user such as MS_C can be less than a link's maximum when radios have scheduled transmission and reception in accordance with the invention, it is preferable to take a user's minimum acceptable throughput into account, along with the user's desired bandwidth ratio, when assigning the user to a radio.